

a stub having a length other than a wavelength of the interrogation signal and being coupled to the second conduction terminal of the switch; and  
a driver coupled between the memory and the control terminal of the switch.

2. (Amended) The transponder of claim 1 wherein the stub is a quarter-wavelength stub.

3. (Amended) The transponder of claim 1 wherein the driver includes a microprocessor.

4. (Amended) A radio frequency transponder, comprising:  
an antenna for receiving an interrogation signal;  
a memory that stores an information code; and  
a phase modulator having a diode, a first terminal of the diode coupled to the antenna and a driver coupled between the memory and a second terminal of the diode, the driver being structured to produce a modulating signal corresponding to the information code, the modulating signal being a variable voltage that modulates a capacitance of the diode to phase modulate the interrogation signal and thereby produce the response signal.

6. (Amended) A radio frequency transponder, comprising:  
an antenna to receive an interrogation signal;  
a memory to store an information code; and  
a phase modulator having:  
a first diode having first and second ends, the second end being coupled to the antenna;  
a second diode having first and second ends, the first end being coupled to the antenna and the second end of the first diode;  
a stub being coupled to the second end of the second diode;  
a parallel RC circuit coupled between the stub and a reference voltage; and

a driver coupled between the memory and the first end of the first diode, the driver being structured to produce a modulating signal corresponding to the information code.

7. (Amended) A radio frequency transponder, comprising:  
an antenna to receive an interrogation signal;  
a memory that stores an information code; and  
a phase modulator structured to produce a response signal according to the information code, the response signal containing a plurality of phases in addition to a phase that is substantially identical to a phase of the interrogation signal.

8. (Amended) The transponder of claim 7 wherein the phase modulator includes first and second phase changers that produce in the response signal respective first and second phases that are each different than a phase of the interrogation signal.

10. (Amended) A radio frequency communication system, comprising:  
an interrogator that transmits a radio frequency interrogation signal and receives a backscatter response signal; and  
a transponder that receives the interrogation signal and transmits the response signal to the interrogator, the transponder comprising:

an antenna;  
a memory that stores an information code; and  
a phase modulator coupled to the memory, the phase modulator comprising:  
a stub having a length other than a wavelength of the interrogation signal;  
a switch coupled between the stub and the antenna and having a control terminal;  
a driver coupled between the memory and the control terminal of the switch, the driver being structured to produce a modulating signal corresponding to the information code, the modulating signal alternately opening and closing the switch.

11. (Amended) The communication system of claim 10 wherein the stub comprises a quarter-wavelength stub.

12. (Amended) A radio frequency communication system, comprising:  
an interrogator to transmit a radio frequency interrogation signal and to receive a backscatter response signal;  
a transponder, the transponder including:  
a memory that stores an information code;  
an antenna to receive the interrogation signal and to transmit the response signal; and

a phase modulator coupled to the memory and structured to produce the response signal by phase modulating the interrogation signal according to the information code, the phase modulator including a diode coupled at a first end to the antenna and a driver coupled between the memory and a second end of the diode, the driver being structured to produce a modulating signal corresponding to the information code, the modulating signal being a variable voltage that modulates an impedance of the diode to phase modulate the interrogation signal and thereby produce the response signal.

13. (Amended) A radio frequency communications system, comprising:  
an interrogator to transmit a radio frequency interrogation signal and to receive a backscatter response signal; and  
a transponder comprising:  
an antenna to receive the interrogation signal and to transmit the response signal;

a first diode having an anode and a cathode, the cathode of the first diode being coupled to the antenna;

a second diode having an anode and a cathode, the anode of the second diode being coupled to the antenna and to the cathode of the first diode;

a quarter-wavelength stub coupled to the cathode of the second diode;

a parallel RC circuit coupled between the stub and a reference voltage; and

a driver coupled between the memory and the anode of the first diode, the driver being structured to produce a modulating signal corresponding to the information code.

14. (Amended) A radio frequency communication system, comprising:  
an interrogator to transmit a radio frequency interrogation signal; and  
a transponder to receive the interrogation signal and to transmit a response signal, the transponder comprising:  
a memory that stores an information code; and  
a phase modulator structured to include in the response signal a plurality of phases in addition to a phase that is substantially identical to a phase of the interrogation signal.

15. (Amended) The communication system of claim 14 wherein the phase modulator includes first and second phase changers that produce in the response signal respective first and second phases that are each different than a phase of the interrogation signal.

17. (Amended) A radio frequency transponder, comprising:  
means for receiving a radio frequency interrogation signal from an interrogator;  
means for phase modulating the interrogation signal according to an information code to produce a response signal; and  
means for transmitting the response signal, wherein the phase modulating means includes:  
stub means having a length other than a wavelength of the interrogation signal;  
signal producing means for producing a modulating signal corresponding to the information code; and  
switching means coupled to the stub means and responsive to the modulating signal.

18. (Amended) The transponder of claim 17 wherein the stub means having a length other than a wavelength of the interrogation signal is a quarter-wavelength stub.

19. (Amended) The transponder of claim 17 wherein the signal producing means include a memory that stores the information code and processing means coupled to the memory, the processing means being for producing the modulating signal as a function of the information code.

20. (Amended) A radio frequency transponder, comprising:  
means for receiving a radio frequency interrogation signal from an interrogator;  
means for phase modulating the interrogation signal according to an information code to produce a response signal; and

means for transmitting the response signal, wherein the phase modulating means include driver means for producing and applying to a diode means a modulating signal corresponding to the information code, the modulating signal being a variable voltage that modulates an impedance of the diode means to phase modulate the interrogation signal and thereby produce the response signal, the diode means being coupled between the driver means and the means for transmitting the response signal.

22. (Amended) The transponder of claim 20 wherein the diode means include:  
a first diode coupled to the transmitting means;  
a second diode coupled to the transmitting means and the first diode;  
a quarter-wavelength stub coupled to the second diode;  
a parallel RC circuit coupled between the stub and a reference voltage; and  
a driver means coupled to the first diode, the driver means being for producing and applying to the first diode a modulating signal corresponding to the information code.

23. (Amended) A radio frequency transponder, comprising:  
means for receiving a radio frequency interrogation signal from an interrogator;

means for phase modulating the interrogation signal according to an information code to produce a response signal; and

means for transmitting the response signal, wherein the phase modulating means include first and second phase changers that produce in the response signal respective first and second phases that are each different than a phase of the interrogation signal.

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25. (Amended) A method of radio frequency communication, the method comprising:

receiving a radio frequency interrogation signal from an interrogator;

phase modulating the interrogation signal according to an information code to produce a response signal by alternately opening and closing a switch according to a modulating signal corresponding to the information code, the switch being coupled between an antenna that transmits the response signal and a stub that has a length other than a wavelength of the interrogation signal; and

transmitting the response signal.

26. (Amended) The method of claim 25 wherein the stub that has a length other than a wavelength of the interrogation signal is a quarter-wavelength stub.

27. (Amended) A method of radio frequency communication, the method comprising:

receiving a radio frequency interrogation signal from an interrogator;

phase modulating the interrogation signal according to an information code to produce a response signal by producing a modulating signal corresponding to the information code, the modulating signal being a variable voltage applied to a first terminal of a diode to phase modulate the interrogation signal and thereby produce the response signal; and

transmitting the response signal from an antenna coupled to a second terminal of the diode.